Predict to protect: developing trait-based vulnerability indices to wind energy development for birds and bats.

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INTRODUCTION

The wind power industry is rapidly developing across the whole planet with ambitious goals in the short and long terms. The impact of wind farms on biodiversity, especially birds and bats, requires urgent solutions at local and global scales. The main goal of my PhD project is to propose new tools to mitigate mortality caused to birds and bats by wind power development (onshore and offshore). These tools are vulnerability indexes to identify the most vulnerable species, and risk maps to identify the most sensitive regions for aerial biodiversity. These tools will contribute to better wind energy development planning regarding bird and bat protection.

Wildlife mortality by windmills is a global issue. However, I decided to implement my approach on two large territories: the European Union (EU) and the United States of America (USA). These two regions are among the top producers of wind energy and have the most data available on bird and bat distributions, and impact of windmills on birds and bats. They harbor different policies and wind farm development approaches, which will be compared during my project.
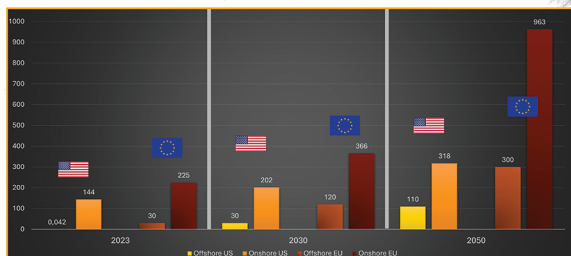

Figure1: Present and future wind farms development in the EU and in the USA

1st OBJECTIVE

Develop a method to calculate the demographic sensitivity, and the displacement and collision vulnerabilities to wind turbines for each species of raptor, seabird and bat in the EU and the USA. Use them to compute a global risk assessment score of the species to wind turbines. Validate the results using existing mortality data for the vulnerable species.

Figure 2: schematic representation of the risk score assessment

2nd OBJECTIVE

Aggregate maps of species distributions for birds and bats in Europe and the USA, to map the vulnerability of biodiversity to wind turbines. For this, the risk assessment score will be used to weigh species. Cross them with maps of present and future development of wind turbines. Define regions of high risk and regions of low risk suitable for present and future wind energy development.
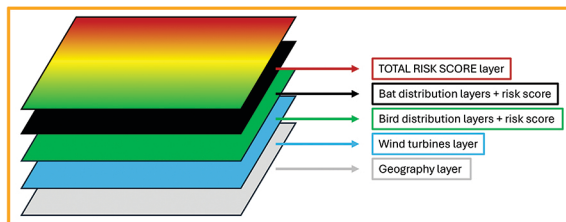

Figure 3: schematic representation of the risk map layers

3rd OBJECTIVE

Assess the policies framework implemented in the EU and in the USA to protect the vulnerable species determined by the risk assessment and compare the approaches between the two continents.

PURPOSE

At the end of the project, I will provide a synthesis of the vulnerable species on both continents, with a map of sensitive regions where the development of wind farms is more likely to harm bird and bats biodiversity. In addition to generating invaluable biological knowledge, these tools will help consulting firms, wind energy developers and decision makers to act in the best interests of birds, bats and humans.